Patent Claims

1. A device for the photolithographic exposure of biological substances, comprising at least one light source, a bundle of light-guide optical fibers, and a control unit, wherein each of the optical fibers can be controlled by light and/or light can be coupled to these fibers, independently of one another.

2. The device according to claim 1, further characterized in that the light source emits monochromatic or continuous light in a wavelength range of 100 to 800 nm.

3. The device according to claim 2, further characterized in that the light source is a laser, a luminous diode, a metal-vapor lamp, a gas-discharge lamp, a gas-excitation lamp, an incandescent-filament lamp or an arc lamp.

4. The device according to one of the preceding claims, further characterized in that luminous diodes and/or optical switches are arranged for the control of the individual optical fibers.

5. The device according to one of the preceding claims, further characterized in that the substances to be exposed are introduced directly at the ends of the optical fibers.

6. The device according to one of the preceding claims, further characterized in that the substances to be exposed are arranged on a separate support.

7. The device according to one of the preceding claims, further characterized in that the substances to be exposed are arranged on a separate support, whereby this support is a DNA chip, a PNA chip or a peptide chip.

8. The device according to one of the preceding claims, further characterized in that the device additionally comprises at least one detector.

9. The device according to claim 8, further characterized in that at least one of the detectors is arranged in such a way that it detects the light used for the exposure and/or at least one detector is arranged in such a way that it detects the light reflected from the exposed substances and/or produced by fluorescence and that optical fibers and/or bundles of optical fibers are optionally provided for light guiding for the detectors.

10. The device according to one of claims 8 or 9, further characterized in that the detectors are CCD detectors and/or CCD cameras.

11. The device according to one of the preceding claims, further characterized in that a dynamic mask is provided for the control of the individual optical fibers.

12. The device according to one of the preceding claims, further characterized in that a set of static masks is provided for the control of the individual optical fibers.

13. The device according to one of the preceding claims, further characterized in that the light source emits a spectrum of wavelengths that bring about

the deprotecting of nucleotides, nucleotide analogs and peptide nucleic acid building blocks for the elongation of the chain and for the construction of oligomers, and that between this light source and the substrate is arranged a bundle of optical fibers, to which light can be selectively coupled each time by targeted control, and that the solid phase on which the oligomer synthesis occurs is positioned precisely and rigidly behind the bundle of optical fibers, and that the solid phase on which oligomer synthesis occurs is arranged in a chamber in which the solutions and/or reagents necessary for the DNA or PNA synthesis can be introduced onto this solid phase by other devices.

14. The device according to claim 13, further characterized in that a separate support is arranged as the solid phase on which oligomer synthesis occurs.

15. The device according to claim 13, further characterized in that the ends of the optical fibers themselves are the solid phase for conducting the oligomer synthesis.

16. A method for the photolithographic exposure of biological substances, whereby the substances are arranged on a surface or at the end of an optical fiber and are exposed by means of light, which is guided by the optical fiber and which originates from a light source that is arranged at the other end of the optical fiber, whereby exposure is made at each point which lies opposite one end of the optical fiber, independently of the other

points, whereby the exposure pattern is selected in advance by means of a control unit.

17. The method according to claim 16, i.e., for the exposure of DNA or PNA chips, further characterized in that light of wavelengths which cause the deprotecting of nucleotides, nucleotide analogs and peptide nucleic acid building blocks for the elongation of the chain and for the construction of oligomers is used and that between this light source and the substrate, a bundle of optical fibers is arranged, to which light is selectively coupled each time by targeted control and that the solid phase on which the oligomer synthesis occurs is positioned precisely and rigidly behind the bundle of optical fibers and that the solid phase on which the oligomer synthesis occurs is arranged in a chamber in which the solutions and/or reagents necessary for the DNA or PNA synthesis are introduced onto this solid phase by other devices.

18. The method according to claim 16, further characterized in that subsequent hybridizations are conducted with a target DNA after the oligomerization has been produced on the DNA or PNA chips.

19. The method according to claim 16, further characterized in that a device according to claim 1 is used for conducting the method.